

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A method for managing a flash memory in which a mapping area, a data area[[,]] and an alternative area ~~and a mapping area~~ are arranged sequentially therein, the method comprising:

if changing of data of a data block recorded at an original address in the data area is requested, recording the data block having changed data in the alternative area and recording mapping information representing an address of the data block recorded in the alternative area in the mapping area; and

if changing of data of the data block recorded in the alternative area is requested, recording a data block having changed data at the original address in the data area and deleting the mapping information representing the address of the data block recorded in the alternative area from the mapping area,

wherein, if the mapping information on the data block exists in the mapping area, data is read from the data block in the alternative area, and if the mapping information on the data block does not exist in the mapping area, data is read from the data block at the original address in the data area.

2. (original) The method of claim 1, wherein the mapping information is a logical block number of the data block.

3. (original) The method of claim 1, wherein if the changed data of the data block are recorded in the alternative area, the changed data are recorded in a temporary block of the alternative area.

4. (original) The method of claim 1, wherein if the changed data of the data block are recorded in the data area, the changed data are recorded in a location of the data area corresponding to a logical block number of the data block.

5. (currently amended) A method for writing data in a flash memory which comprises a mapping area, a data area and an alternative area arranged sequentially therein, the data area having an original address, in which changed data of a data block recorded in an alternative area are recorded, ~~an~~the alternative area, in which the changed data of the data block recorded at the original address in the data area are recorded, and ~~a~~the mapping area containing mapping information representing an address of the data block included in the alternative area, the method comprising:

receiving a data block write request in the flash memory;

searching mapping information on the data block to be requested to write in the mapping area;

if there is no mapping information representing the address of~~on~~ the data block to be requested to write, writing the data block to be requested to write in the alternative area and recording the mapping information ~~on~~representing the address of the data block in the mapping area; and

if there is mapping information ~~on~~ representing the address of the data block to be requested to write, writing the data block to be requested to write in the original address of the data area and deleting the mapping information ~~on~~ representing the address of the data block to be requested to write from the mapping area,

wherein, if the mapping information on the data block exists in the mapping area, data is read from the data block in the alternative area, and if the mapping information on the data block does not exist in the mapping area, data is read from the data block at the original address in the data area.

6. (currently amended) A method for reading data from a flash memory which comprises a mapping area, data area and an alternative area arranged sequentially therein, the data area having an original address, in which changed data of a data block recorded in an alternative area are recorded, an ~~the~~ alternative area, in which the changed data of the data block recorded at the original address in the data area are recorded, and a ~~the~~ mapping area containing mapping information representing an address of the data block included in the alternative area, the method comprising:

receiving a data block read request in the flash memory;

searching mapping information on the data block to be requested to read in the mapping area;

if there is no mapping information ~~on~~ representing the address of the data block to be requested to read, reading the data block to be requested to read from the original address of the data area; and

if there is mapping information ~~on~~ representing the address of the data block to be requested to read, reading the data block to be requested to read from the alternative area,

wherein, if the mapping information on the data block exists in the mapping area, data is read from the data block in the alternative area, and if the mapping information on the data block does not exist in the mapping area, data is read from the data block at the original address in the data area.

7. (currently amended) A flash memory comprising:

a data area having an original address, in which changed data of a data block are recorded when changing of data of a data block recorded in an alternative area is requested;

the alternative area in which the changed data of the data block are recorded when changing of data of the data block recorded in the original address of the data area is requested; and

a mapping area in which a mapping table containing mapping information representing an address of the data block recorded in the alternative area is recorded and from which the mapping information representing the address of the data block is removed when the changed data of the data block are recorded in the original address of the data area,

wherein the mapping area, the data area and the alternative area are arranged sequentially, and

wherein, if the mapping information on the data block exists in the mapping area, data is read from the data block in the alternative area, and if the mapping information on the data block does not exist in the mapping area, data is read from the data block at the original address in the data area.

8. (original) The memory of claim 7, further comprising a master block containing information on the data area, the alternative area, and the mapping area.

9. (original) The memory of claim 7, wherein a physical block number of the data block existing in the data area corresponds to a logical block number on a one-to-one basis.

10. (previously presented) The memory of claim 7, wherein the alternative area includes a predetermined number of blocks, each of the blocks includes a predetermined number of pages, and a first mapping table is recorded in a first page of a first block,

wherein, if contents of the first mapping table are changed, the changed contents are stored in a second table that is recorded in a second page of the first block, and

if all of the pages of the first block have a mapping table recorded therein, a subsequent mapping table is recorded in a first page of a second block.

11. (withdrawn) A method for leveling wear of blocks in a flash memory, the method comprising:

a first step of recording information on a number of electrical erasures of a data block on which electrical erasure is executed after a file system starts; and

if the number of electrical erasures of the data block exceeds a predetermined threshold value, a second step of exchanging the data block with a data block having a smaller number of electrical erasures.

12. (withdrawn) The method of claim 11, wherein the second step comprises:
determining whether an unused physical block exists;
if the unused physical block exists, exchanging a location of the data block with a location of the unused physical block; and
if the unused physical block does not exist, exchanging the location of the data block with a physical block having the number of electrical erasures smaller than the number of electrical erasures of the data block.

13. (withdrawn) The method of claim 11, wherein information on the number of electrical erasures is recorded in a random access memory (RAM).

14. (withdrawn) A system for leveling wear of blocks in a flash memory, the system comprising:
the flash memory in which a data block is recorded; and
a wear leveling list in which information on a number of electrical erasures of the data block on which electrical erasure is executed after a file system starts is recorded.

15. (withdrawn) The system of claim 14, wherein the wear leveling list is recorded in a random access memory (RAM).

16. (withdrawn) The system of claim 14, wherein information on a number of electrical erasures recently executed on data blocks after a file system starts is recorded in the wear leveling list.

17. (withdrawn) The system of claim 14, wherein a data block of which the number of electrical erasures exceeds a predetermined threshold value is exchanged with a data block having a smallest number of electrical erasures.

18. (withdrawn) A method for managing a file system for a flash memory including a file area and a file allocation table (FAT) area, the method comprising:

recording information on a cluster of a file recorded in the file area in the FAT area;
if changing of the file is requested, recording the changed file in a new cluster; and
reflecting information on the new cluster on the information on the cluster recorded in the FAT area.

19. (withdrawn) A method for updating files in a flash memory, the method comprising:
recording information on a next cluster of a file recorded in a data area in an entry of a file allocation table (FAT) area having an entry corresponding to each cluster in the data area;

if data updating of a cluster C_{old} included in the file is requested, recording updated data in a new cluster C_{new} ; and

modifying the information on the next cluster so that the new cluster C_{new} is connected to the entry of the FAT area instead of the cluster C_{old} .

20. (withdrawn) The method of claim 19, further comprising recording information on a first cluster of the file in a root directory area.

21. (withdrawn) The method of claim 19, wherein recording of information on the cluster in the entry of the FAT area is performed by atomic write, and recording of file data in the cluster of the data area is performed by non-atomic write.

22. (withdrawn) A flash memory file system comprising:

a data area in which a file comprised of one or more clusters is recorded;
a root directory area containing information on a first cluster of the file recorded in the data area;
and

a file allocation table (FAT) area which contains an entry corresponding to each cluster and in the entry of which information on a next cluster of the file recorded in the data area is recorded;

wherein if changing of data of a predetermined cluster forming the file is requested, the changed data is recorded in a new cluster, and information on the new cluster is connected to the information on the cluster of the file recorded in the FAT area.